RISK TRANSFER VIA ENERGY SAVINGS INSURANCE

A Potential Asset for the ENERGY STAR Buildings Program

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SUMMARY

Among the key barriers to investment in energy efficiency improvements are uncertainties about attaining projected energy savings and apprehension about potential disputes over these savings. The fields of energy management and risk management are thus intertwined. While many technical methods have emerged to manage performance risks (e.g. building commissioning), financial risk transfer techniques are less developed in the energy management arena than in other more mature segments of the economy. Energy Savings Insurance (ESI)—formal insurance of predicted energy savings—is one method of transferring financial risks away from the facility owner or energy services contractor. ESI offers a number of significant advantages over other forms of financial risk transfer for energy-efficiency projects, e.g. savings guarantees or performance bonds. ESI providers manage risk via pre-construction design review as well as post-construction commissioning with measurement and verification of savings. We found that the two most common criticisms of ESI—excessive pricing and onerous exclusions—are not born out in practice. In fact, if properly applied, ESI can potentially reduce the net cost of energy savings projects by reducing the interest rates charged by lenders, and by increasing the level of savings through quality control. Debt service can also be ensured by matching loan payments to projected energy savings while designing the insurance mechanism so that payments are made by the insurer in the event of a savings shortfall.

We estimate the U.S. ESI market potential of $1 billion/year in premium income, assuming premiums equal to 3 percent of savings. From an energy-policy perspective, ESI offers a number of potential benefits:

- ESI transfers performance risk from the balance sheet of the entity implementing the energy savings project, thereby freeing up capital otherwise needed to "self-insure" the savings.

- ESI reduces barriers to market entry of smaller energy services firms who do not have sufficiently strong balance sheets to self-insure the savings.

- ESI encourages those implementing energy saving projects to go beyond standard, tried-and-true measures and thereby achieve more significant levels of energy savings; and

- ESI providers stand to be proponents of improved savings measurement and verification techniques, as well as maintenance, thereby contributing to national energy savings objectives and perhaps elevating the quality of information available for program evaluation.

Governmental agencies have been pioneers in the use of ESI and could continue to play a role in developing this innovative risk-transfer mechanism. There is particular potential for linkages between ESI and the ENERGY STAR Buildings Program. It is likely that ENERGY STAR-labeled commercial buildings (which have lower performance risk thanks to commissioning) would be attractive to providers of energy savings insurance. Conversely, the award of energy savings insurance to an ENERGY STAR-labeled building would raise the perceived credibility of the Label and energy savings credited to the Program.

1 RISK MANAGEMENT TECHNIQUES FOR ENERGY EFFICIENCY PROJECTS

A growing body of literature suggests that efforts to measure energy savings in commercial buildings reveal that intended efficiency targets are not always met (Diamond et al. 1992; Vine 1993; Piette 1994). Perceived risk of underperformance can pose various kinds of barriers to efficiency projects, or dissuade project teams from pursuing high levels of savings requiring new technologies or techniques. In cases where external financing is required, this perceived risk of underperformance can have a particularly adverse effect on a project's viability. From a building owner's perspective, the prospect of disputes with sophisticated energy management companies are often seen as a losing proposition and can contribute to considerable reluctance to initiate projects.

In other sectors of the economy, risk transfer mechanisms have been developed to facilitate investment (e.g. FDIC insurance or debt securitization). This has to date been much less apparent in the energy management arena.

Technical strategies are increasingly used to reduce the risk of underperformance in energy saving projects. These include a host of diagnostics and commissioning processes that can detect potential causes of underperformance and remedy them early on. The inclusion of commissioning in the ENERGY STAR Buildings process, and basing the Building Label on actual (measured) energy use are prominent examples of this trend. The International Performance Measurement and Verification Protocol (IPMVP) is another type of technical strategy to reduce performance risk (Kats et al. 1997).[1]

Financial strategies are also increasingly used to reduce the risk of underperformance. These include Savings Guarantees, Performance Bonds (also known as "Surety Bonds"), and Energy Savings Insurance (ESI).[2]

- *Energy Savings Insurance* is a formal insurance contract between an insurer and either the building owner or third-party provider of energy services. In exchange for a premium, the insurer agrees to pay any shortfall in energy savings below a pre-agreed baseline, less a deductible. ESI has traditionally been used for existing buildings that are retrofitted to achieve savings, but several insurers are now investigating applications to new buildings where a logical baseline (e.g. existing energy codes) can be defined. Pricing is typically expressed as a percentage of energy savings over the life of the contract; e.g. 2.5 percent with a 10 percent deductible is a representative price level, although it is sometimes expressed as a percentage of project cost. The premium is paid once, in the first year of operation. Such policies are non-cancelable, so the owner is guaranteed to have access to the insurance for the originally agreed

[1] For more information, see http://www.ipmvp.org.

[2] Note that these risk-transfer tools are often applied to water conservation projects as well.

contract term. ESI typically insures annual savings expectations (a "volumetric" approach), although we encountered one example where a payback time was insured.[3] ESI appears to be most widely practiced in Canada and the U.S., with examples also in Brazil and Malaysia. A sample ESI policy is included as Appendix A.

- *Surety Bonds* offer another method of risk transfer. Surety bonds can be applied to the construction phase of an energy savings project as well as to the ongoing savings stream. Surety bonds are three-party contracts among insurer, contractor, and property owner. If contractor doesn't perform (e.g. energy savings are not achieved), the contractor has to reimburse the insurer. In the case of construction, the bond is a bet that the project can be completed for a particular price, and the bond will pay for completion of the project if necessary. Many projects in state-owned facilities require surety bonds. Pricing is typically 1 percent of project cost or stipulated savings, with a wide range (0.1 percent to 1.5 percent) depending on the caliber of the bond purchaser.[4] In practice, surety bonds have extremely limited application. Given their potential liability, very few contractor companies have strong enough balance sheets to qualify. Meanwhile, insurers (being able to recover losses from the contractor) have limited motivation to prevent claims. Thus, performance bonds are not true risk transfer for the contractor in that, unlike ESI, they remain liable for any shortfall. Surety companies also prefer not to take liability for periods exceeding three years. Providers of surety bonds are interested solely in the solvency of the insured (contractor), and thus have little interest in technical risk management such as that provided by building commissioning or M&V activities.

- *Savings Guarantees* are offered by providers of energy management services, who effectively "self-insure" the energy savings, i.e., retain the risk internally rather than selling the risk to a provider of insurance or bonds. Disadvantages of savings guarantees include the non-transparency of costs, given that they're bundled in with the broader performance contract, and the potential conflict of interest arising from the fact that those liable for underperformance are also typically those performing the savings measurement. Savings guarantees can also have an effective "deductible", wherein the provider negotiates a lower project cost if the owner is willing to assume a fraction of the performance risk (i.e. accept something less than a 100 percent savings guarantee). Historically there has been a competitive tension between providers of savings guarantees (ESCOs) and providers of energy savings insurance, with ESCOs feeling that their credibility was undermined by the perceived need for ESI and loss of profits from their own "guarantee premium". The situation has improved somewhat as the ESI product has been positioned in a fashion that better-supports (essentially as "reinsurance") and complements guarantees offered by ESCOs.

[3] This is a less desirable way to articulate the product, because the insurer would have no stake in the ongoing performance of the project once the payback is attained.

[4] In one example we identified, bond costs for a $200,000/year energy savings guaranty ($1.8M cap cost project) were $3,000 to 4,000 annually (1.5 to 2% of the project's lifetime savings).

Hybrid systems have been discussed, e.g. formulating ESI as backup insurance (reinsurance) for ESCO guarantees, or combinations of surety bonds (e.g. to guarantee completion of a job) and ESI (to guarantee performance).

We identified one comparative analysis of energy savings guarantees and energy savings insurance (BCBC 2001). The study found that in British Columbia, the cost of savings guarantees has historically equaled 4 percent to 13 percent of project costs (range is a function of project risk, competition, deductible, cost markups). Participants in the BC Retrofit Program have offered guarantee prices from 3 percent to 5 percent with no deductible (BCBC 2001). In contrast, the study found that ESI has historically equaled 3.5 percent to 6 percent, with deductibles ranging from 5 percent to 10 percent (range is a function of project risk, competition, deductible, risk), and insurers have offered 3.5 percent pricing under the BC Retrofit Program (5 percent deductible). Rates as low as 2.5 percent have been offered by Canadian energy savings insurers.

As shown in Table 1, the choice of risk-transfer method can affect the borrowing rate and hence the overall profitability of the project.

Table 1. Cost comparisons of self-financing, third-party financing with savings guarantees, and third-party financing with energy savings insurance. Canadian conditions, late 1990s (NRCb n/d).

	Client-arranged Financing: No risk transfer	Third-party Financing: Traditional Savings Guarantee	Third-party Financing: Energy Savings Insurance
Project Cost	$1,000,000	$1,000,000	$1,000,000
Annual Energy Savings	$250,000	$250,000	$250,000
Interest Rate	6.0% to 7.0%	8.5% to 9.0%	7.0% to 8.0%
Interest Cost	$132,000 to $160, 250	$289,000 to $292,000	$185,400 to $219,000
Payback time	5.1 to 5.2 years	6.1 to 8.2 years	5.5 to 5.7 years
Cost of guarantee	On balance sheet	10% to 14% of project cost (including interest)	4% to 6% of project cost (including interest)

Note: interest cost is over life of project.

In the remainder of this report, we focus on energy savings insurance (ESI) as a technique for transferring performance risk. To explore this area in more depth, we conducted interviews with various players in the energy savings marketplace. These include customers (building owners), service providers (e.g. ESCOs), lenders, insurers, agents, and brokers.

2 THE MECHANICS OF ENERGY SAVINGS INSURANCE

ESI provides insurance for stipulated energy savings. One provider uses the more descriptive term "Energy Conservation Savings Contractual Liability Insurance" to describe the product. We identified 12 insurance companies who now or in the past have provided this product, as well as 4 brokers or agents who serve as intermediaries between customers and insurers (Box 1).

Box 1. Selected insurance companies and brokers/agents previously or currently offering Energy Savings Insurance.

Insurance Companies

- AIG (U.S.)
- Hartford Steam Boiler (U.S.) and affiliate Boiler Inspection & Insurance (Canada). Both firms now owned by AIG.
- CGU (UK, Canadian Subsidiary)
- Chubb (U.S.)
- Employers Re (U.S.)
- Lloyds of London (UK)
- New Hampshire Insurance Co. (U.S. subsidiary of AIG)
- North America Capacity Insurance Co. (U.S., owned by Swiss Re)
- Safeco Insurance Company of America (U.S.) – surety bond
- Sorema Re (Canada – Now owned by Scor Reinsurance; reinsures BI&I's policies)
- US Fidelity and Guarantee Co. (U.S.) – surety bonds
- Zurich American/Steadfast Insurance Co. (U.S.)

Agents/Brokers

- Aon Risk Services (U.S.) – broker
- Morris & Mackenzie (Canada, broker)
- NRG Savings Assurance (U.S. – sole agent representing NACICo)
- Willis Canada (Broker – U.S. headquarters)

The likelihood of losses is reduced through various technical strategies, including the completion of an engineering design review and metering plan prior to construction (and the issuing of insurance), of "Acceptance Tests and verifications of efficiencies specified in the design document, conducted under a commissioning protocol. In addition, insurers can conduct site inspections (often annual) during the life of the contract. The baseline is reviewed regularly, and adjusted to reflect changes in operating conditions, etc.[5] Some insurers also retain the option to make investments in the facility that can avoid potential claims.

[5] Quoting from one sample policy, factors used in defining and adjusting baselines can include "type, frequency, intensity of use of the building, seasonal temperature averages, fuel costs, costs of outside services, wage and salary rates and cost-escalation factors upon which calculated energy costs are based."

Pricing is highly variable, being a function of the size of the project, quality of the project, and the parties involved. Two major types of pricing are used. The first is structured like typical insurance, with the purchaser retaining a portion of the risk via a deductible. Typical deductibles are in the 5- to 10-percent range. Losses are typically capped at some upper number. The alternative formulation is what is referred to as "co-insurance", wherein the insurer pays a certain percentage of each dollar of loss (e.g. 10 percent). Because the insurer pays parts of even small claims under co-insurance, the premiums tend to be slightly higher. Premiums ranging from 0.5 percent to 6 percent of energy savings have been cited, and in some cases a one-time fee (e.g. 0.75 percent) for engineering/underwriting review. Insurance terms rarely exceed 10 years, and are more typically in the 5-year range.

While there is a cost premium for ESI, the cost can be offset by lower financing rates (as illustrated in Table 1) as well as improved project performance resulting from engineering review from the insurer.

In the U.S., state governments have been highly instrumental in the evolution of ESI, dating back to the mid-1980s. Similarly, in Canada provincial governments have helped to build the market for energy savings insurance (Box 2).

For example, among the goals of the Iowa Energy Bank program for public schools was to provide assistance in obtaining energy savings insurance (Iowa Department of Natural Resources ND). The state of Illinois has required ESI in its RFPs for energy management services in state-owned facilities (Illinois Department of Commerce and Community Affairs 1999). Mississippi's RFQ for energy services requires demonstration of energy savings insurance (Mississippi Development Authority 1998). The State of Maryland often uses ESI, and has required it in the past (State of Maryland Department of Public Works 1998). ESI was the single-most popular form of savings guarantee in their last round of RFP responses. ESCOs who propose projects must identify ESI providers and terms. In one example, a $3-million capital-cost project had a $15,000 ESI cost (0.5 percent of the project cost) over 15 years.

We found at least one example of ESI being used in public housing: a $1.7 million retrofit project at North Carolina housing authority in which projected savings of $374,784 annually are guaranteed by an insurance company over a period of 12 years (NCAT n/d).

A general rule of thumb is that large providers of energy services do not need ESI, as they can self-insure. In fact, these large firms may see ESI as a threat because they are otherwise able to pass their self-insurance cost on to customers and stand to earn a margin on that cost. Similarly, externally procured insurance eats into bottom-line profits. However, one large firm pointed out that although they could easily self-insure, the presence of externally provided insurance would facilitate investment decision-making within the company by reducing the perceived complexity and risk of projects.

Box 2. Case Study: The British Columbia Buildings Corporation Experience.

This British Columbia initiative was established to improve the operating efficiency of provincially-funded buildings and, in the process, reduce their environmental impact and foster the growth of BC's environmental industry. It targets both new and existing facilities. The British Columbia Buildings Corporation is the implementing agent.

The Retrofit Program encourages provincially-funded school districts, universities, colleges and health care institutions to retrofit their facilities to improve their energy and water efficiency, and reduce their greenhouse gas emissions and waste generation. The total cost of facility retrofits is repaid by the utility savings that result.

A key and innovative element of the Program is the use of financial mechanisms to transfer performance risk (i.e. underachievement of energy savings) from the participating educational and health care institutions to the energy services provider or to a third-party insurer. The Program promotes the concept of Energy Savings insurance through an agent (representing several insurers) identified through a competitive request for proposals. Premiums have been pre-negotiated by BCBC at rates considerably lower (3.5 percent of the overall project cost [first cost and interest], with a 5 percent deductible) than those prevailing in Canada previously. Insurers have the option of investing in capital improvements to mitigate problems with the retrofit systems that could otherwise precipitate a (costlier) loss.

Unless funded within existing facility budgets, projects must utilize either energy savings insurance or performance guarantees. Of the $26 million (Canadian dollars) in capital investment planned or completed since the launch of the Program in 2000 and for which a performance risk mechanism has been selected, 27 percent (CD$7 million) has been done with energy savings insurance and the balance with performance guarantees (Maslany 2001).

BCBC is also considering applying similar risk-transfer concepts to their New Buildings program.

For more information, see http://www.greenbuildingsbc.com/

Some question the need for ESI, given how much is known today about energy saving technologies. This view probably holds for those who are relatively un-ambitious and stick to the same techniques from project to project without “pushing the envelope” or working in non-traditional settings. Many of those interviewed stated that ESI can be a valuable countervailing factor in such situations. Projects aiming at “cream-skimming” have little need for ESI or other forms of savings guarantees.

We spoke with one firm that finances energy-savings projects, and at times serves as an intermediary between the ESCO and ESI provider. They noted that one of the major barriers to obtaining financing is the risk of customer disputes about savings, hence ESI is a risk-reducing

tool from the perspective of those providing financing. About 3 to 6 percent of their projects developed over the past year utilize energy savings insurance.

Iowa's in-house ESCO (Iowa Facilities Improvement Corp) was formed with $12 million in bonds for energy-saving projects, and self-insured their energy savings (based on a small fee for each project). In their experience, savings guarantees rarely cover more than 80 percent of the predicted savings, typically 75 percent, thus leaving part of the risk with the building owner.[6] Their M&V efforts are very intensive and the need for their in-house insurance is minimal. However, they estimate that their achieved savings would be about 60 percent of expectations without M&V. They noted that ESI provides an opportunity for a greater diversity of firms to provide energy services, not just traditional ESCOs.

ESI has had a particularly notable level of support in Canada, including endorsement by the Parliament (Canadian Parliament 1997). Canada's Federal Buildings Initiative made an effort to promote ESI, but reportedly without much success. According to the FBI, an engineer's stamp, a firm's reputation, built-in savings safety margins, and pre-qualification of vendors can accomplish much of the same goals. They note that energy savings insurers often avoid soft measures (e.g. training) that hinge on human factors. British Columbia Buildings Corporation, on the other hand, has found ESI to be a valuable component in their provincial retrofit program (BCBC 2001).

Energy savings insurance, properly applied, can yield retrofit projects of high quality. Insurers are motivated to promote care in design and construction, as well as post-construction measurement and verification. Meanwhile, ESI reduces financial risks for various parties. The benefits are summarized in Box 3.

[6] These terms are negotiable, lower coverages translate into lower costs. One-hundred-percent performance guarantees are offered by ESCOs under the Green Buildings BC program (see Box 1).

Box 3. Benefits of Energy Savings Insurance.

- Lower cost than traditional savings guarantees.
- Careful measurement of actual energy use and savings.
- Impetus for maintaining energy-saving equipment and systems.
- Owner's peace of mind stemming from pre-approved project documents, independent engineering review, and performance verification protocols provided by the insurer and their engineering consultants.
- Involvement of insurers sends a signal to other trades that performance projections and measured data will be independently scrutinized, and underperformance could result in real costs or even litigation.
- Transparent and explicit criteria for defining baseline energy use levels and savings, which remove uncertainties for the owner and can simplify contract negotiation.
- "Cream-skimming" is discouraged by removing the downside risk of more ambitious savings measures. More aggressive projects (deeper savings) are sought thanks to availability of risk transfer mechanisms.
- Removal of risk that project underperformance will jeopardize the solvency of the energy service provider or lender (Natural Resources Canada n/d-a).
- Enhances competition by enabling smaller firms to bid on projects, where it would otherwise be impossible due to the inability to self-guarantee savings and performance.
- Lower costs of financing thanks to transfer of performance risk off of the project balance sheet of borrower, be it building owner or contractor. Off-balance-sheet (non-recourse) inancing enables the facility owner to enlarge the budget for EEMs (Natural Resources Canada n/d-a and n/d-b) or borrow for other purposes.
- Debt service can be ensured by matching loan payments to projected energy savings while designing the insurance mechanism so that payments are made by the insurer (and from set-aside account holding the deductible amount) in the event of a savings shortfall, as is done in British Columbia.
- Improved credit-worthiness of ESCOs (Adelaar, Day, and Fraser 1997).
- Financial regulation of insurers reduces the likelihood of their insolvency, whereas no such regulation exists for ESCOs or other providers of savings guarantees.

Taken together, these benefits considerably mitigate two important barriers to energy efficiency projects: risk of under-attainment of savings and aversion to disputes over savings.

3 INSURER PERSPECTIVES

Insurers are continually looking for new product ideas. ESI is one such product, which is offered by relatively few companies as yet (Box 1). While ESI has significant untapped upside potential for the insurance industry, it will always be a niche product, given the relatively small potential premium volume.

Data on the total market size of energy savings insurance are not readily available. One Canadian insurer with current policies representing approximately CD$20 million in energy savings estimated their market share at 25 percent; another insurer placed the savings of their current projects in the CD$45 million range. This implies that roughly CD$80 million in savings are currently insured in Canada. No total-market data have been found for the U.S. The ESI industry is clearly in its infancy yet has considerable upside potential.

To estimate of the potential U.S. market size, one can assume that the $107-billion U.S. commercial buildings annual energy bill (DOE 2001) could be reduced by one-third. With a premium equal to 3 percent of energy savings, this could correspond to annual premiums of $1 billion (Table 2). While this is a significant amount of revenue, it is small compared to the several hundred billion dollars collected in overall U.S. property/casualty insurance premiums each year. However, there are other well-established specialty insurance products with comparable levels of premium income.

Table 2. Scoping estimate of U.S. energy savings insurance market potential.

Annual commercial buildings energy cost	$107 billion/year
Annual energy savings potential (33%)	$35 billion/year
Annual insurance premium (3% of savings)	$1.059 billion/year

Note that lifetime premiums for any given contract are paid in first year; amount shown above is annualized. Industrial buildings not included in above estimates.

One relatively novel benefit of ESI (from an insurer's perspective) is that the first 24 months or so can be expected to be free of claims, i.e., while the consumption history is accumulating and the building is being commissioned. Another benefit is that, while a project may have, say $10 million in projected energy savings over a 10-year period, the loss potential in any single year is only $1 million.

Risk management (loss control) is of central importance for insurers. However, conventional insurers do not possess expertise about energy use and energy management in buildings. Insurers understandably tend to shy away from the unfamiliar. When they do insure the unfamiliar, the terms reflect the uncertainties – which means that insureds find themselves faced with exclusions that dilute the value of the product. ESI insurers, however, are more sophisticated when it comes to energy management. Rigorous engineering review is typically required before placing the insurance, plus periodic site visits, and sub-metering. One insurer utilizes the International Performance Measurement and Verification Protocol developed by the U.S. Department of Energy.

At least one insurer allows the property owners to purchase the insurance directly (known as "first party" coverage in insurance parlance). This eliminates the risk of ESCO viability from the equation, e.g., if there is a loss and the ESCO no longer in business, the building owner can still obtain payment for the lost savings. The risk of customers filing dubious claims (a problem known as "moral hazard" in insurance parlance) is mitigated by up-front engineering review by the insurer, quarterly reporting, annual on-site visits, choosing reputable ESCOs and contractors, and the availability of funds from the insurer to proactively remedy problems that may otherwise lead to claims.

A complicating factor for ES insurers is that the risk of claims is relatively high (compared to standard types of insurance), while the severity of losses is generally low. This elevates purchaser sensitivity to pricing and size of deductibles. Meanwhile, loss-conrol costs can be high in relation to premium income.

For insurers, an added strategic benefit of providing energy savings insurance is that certain energy efficiency strategies also stand to reduce ordinary insurance losses (e.g. those from fires caused by inefficient halogen torchiere light fixtures) (Mills and Rosenfeld 1996; Mills 1997; Vine et al. 1998; Vine et al. 1999).

4 LOSS CONTROL

There are two primary approaches to insurance loss control: contractual and technical.

Contractual methods for loss control include exclusions on the policy, or the ability to shift the loss cost to others (as is done in performance surety bonds wherein the insurer can make claims on the contractor in the event of a loss). Insurance providers also limit claims through the use of deductibles.

Technical methods for loss control include a host of quality assurance techniques used during design, construction, and startup of a project. Most of these are captured within the set of tools known as building commissioning. Using measurement and diagnostics to track actual performance, and make corrections before claims materialize is also important.

Energy savings insurers may become proponents of more rigorous measurement and diagnostics procedures. An acute case for the need is in the design of semiconductor fabrication facilities, where degradation of rated chiller efficiencies can amount to large losses in savings. In one example, a central plant designed for a COP of 7.8 is achieving 30 percent poorer performance, i.e. a COP of 5.5 (Lock 2001). This will translate into a $375,000 shortfall in annual energy savings compared to the design intent. Commonly used sensors and COP measurement techniques are accurate to only within +/- 15 percent. Providers of energy savings insurance would have an incentive to promote better design and measurement techniques, which are currently available but are often dismissed as un-necessary.

5 EXCLUSIONS

Some cite the exclusions used in ESI contracts as unreasonable. In fact, all insurance policies have (and must have) exclusions, although, if exclusions become excessive, customers can indeed be expected to dispute prices or forego coverage.

In the case of ESI, it is important to note that exclusions are flexible. ESI is a "surplus lines" type of coverage, which means that contract terms (including exclusions) are negotiated (also known as "manuscripted" policies) on a case-by-case basis. Many familiar types of insurance (e.g. auto or life) are generic, and buyers typically have no opportunity to negotiate the terms.

Typical ESI policy exclusions, and their rationale, are noted below:

· Inadequate Maintenance.

  Maintenance requirements should be stipulated in the underlying energy services contract. The responsibility for maintenance should reside with the insured (or the energy performance contractor).

· Physical Damages to Energy-efficient Equipment, Including Wear and Tear.

  Physical damage is an insurance risk covered under the standard property damage policy of the property owner. ESI providers should not double-charge insureds by providing coverage already possessed by their customers. Wear and tear is a matter of lack of maintenance (see above). The wear-and-tear policy terms are in fact quite valuable, where the goal is to ensure the persistence of savings via a responsible maintenance program. Good policies will require replacement of non-durable items during the term of coverage. Lost energy savings due to physical damage may be covered in a property owner's business interruption insurance or by the ESCO – again, there is no merit to doubling up on such coverage.

· Financial Default of the Purchaser.

  The exclusion pertains to the default of the property owner. Again, this in a case where the underlying contract typically stipulates the exclusion. This exclusion can be waived where it does not apply. Moreover, financial default is typically the result of default on the loan used to finance the project: ESI is not financial-guarantee insurance.

· Sabotage/Misuse/Vandalism of Equipment.

  This exclusion is focused on intentional acts and is covered in other types of insurance typically carried by the insured.

- Changes of Laws or Codes.

  This is typical language in most types of insurance policies, due to the horrendous losses incurred in the past (notably, asbestos claims). Performance contractors typically don't sign contracts with this type of language. If a contract with the Property Owner offers this clause, then the ESCO can negotiate the deletion of such language.

- New End Uses That Increase Energy Use.

  The effects are nullified in that performance contracts normally allow for the baseline to be modified if end uses are added to or subtracted from the site. Policies typically state that the reconciliation will allow for adjustments of baseline. Thus, this exclusion simply prevents the creation of a claim as a result of the addition of end uses.

- Changes in Energy Prices.

  ESI policies are not market-risk coverages. ESCOs typically freeze the values of the energy prices in their performance contract language. Again, the energy savings insurer is guarantying technical performance of energy-saving equipment, not market conditions.

- Environmentally Unsafe Materials Released During Construction or Operation

  Other types of insurance, e.g. Environmental Liability, cover this risk.

- Failure or Malfunction of Data Acquisition Systems.

  This exclusion stands to enhance project quality, by promoting the proper selection and maintenance of metering equipment.

In sum, we do not find the kinds of exclusions listed above as unreasonable or in any way departing with the purpose or spirit of energy savings insurance. It is important to remember that ESI operates in consort with other forms of insurance. Insureds should avoid situations in which they are paying twice (i.e. through different policies) for the same coverage.

6 IMPLICATIONS AND OPPORTUNITIES FOR ENERGY STAR

Energy Savings Insurance has been mentioned in past ENERGY STAR materials (EPA 1997), although the Program has never proactively encouraged the use of ESI.

The ENERGY STAR Building Label offers a potentially valuable "risk-management" tool for energy savings insurers. Since ENERGY STAR emphasizes quality assurance (through commissioning), and because the label is rewarded based on *actual* energy use (savings), it reduces the likelihood that insurers would experience claims. The Label and associated quality

control process could be welcomed by insurers as an added risk-management asset. Given that insurers are eager to lower their risk management costs, developers of ENERGY STAR buildings would likely enjoy lower premiums. Deductibles could also be lowered, and perhaps even waived in certain cases.

One factor that would need to be addressed is that ESI is typically utilized when a third party (e.g. ESCO) is warranting the savings. Were ESI sold directly to a building owner, there could be a conflict of interest. In Canada, however, energy savings insurers have overcome this barrier through close involvement in retrofit quality control, measurement, and verification. This approach could be emulated in the U.S. This deserves attention, to the extent that ENERGY STAR buildings are owner-developed.

Most people we interviewed believed that the ENERGY STAR message would be considerably strengthened if linked to energy-savings insurance. From a practical standpoint, it would create a new financial incentive to get the Label. From a brand-quality perspective, the trust and endorsement evidenced by insurers who potentially adopted the Label and ENERGY STAR in general as a risk management tool would bolster ENERGY STAR's credibility. One respondent suggested that more people would seek the Label if the energy-savings insurer took responsibility for completing the paperwork.

A logical next step would be to approach insurers and brokers/agents assess interest in collaborating with ENERGY STAR (analogous to partnerships forged in the past with lenders), e.g. in cross-marketing products and in providing premium credits and/or lower deductibles for labeled buildings. More information should also be gathered from current providers of ESI to determine the market size, perceived barriers, opportunities, etc. Existing contract templates should be reviewed to see if the stipulated methods for loss control and measuring and verifying savings are consistent with ENERGY STAR's approach.

7 CONCLUSIONS & NEXT STEPS

ESI offers new method to enhance market transformation in the energy sector, and it has considerable untapped potential to increase market confidence in energy savings claims. ESI offers a number of significant advantages to other forms of risk transfer (savings guarantees or performance bonds). However, hybrid approaches should be explored (surety bonds to guarantee completion of the project and energy savings insurance to guarantee the subsequent stream of energy savings).

We found that the two most common criticisms of ESI—excessive pricing and onerous exclusions—are not born out in practice. The exclusions typically found in policies have largely to do with avoiding double-coverage for risks already insured under other types of policies (e.g. property damage) or promote customer-side vigilance over the persistence of savings. ESI pricing seems quite reasonable, at plus-or-minus two percent of total lifetime energy savings.

From a policy perspective, it is worth noting that smaller energy-savings firms are especially benefited by ESI, as they lack the financial resources to self-insure or purchase performance bonds. The same holds for relatively small financing firms. Thus, ESI stands to level the playing field between large and small firms engaged in the energy services marketplace. The other important dimension for policymakers is that the presence of ESI encourages the parties to go beyond standard, tried-and-true measures (e.g. electronic ballasts and T8 lamps) and thereby achieve more significant levels of energy savings. Similarly, energy savings insurers stand to be proponents of improved savings measurement and verification techniques, thereby contributing to national energy savings objectives and perhaps improving the quality of information available for program evaluation. Interestingly, ESI has also been promoted by developers of new energy-efficient technologies, to help reduce barriers to market entry.

Thus far, we have found no evidence of efforts to track and evaluate the real-world experience of energy savings insurance agreements, or detailed financial analysis of the added project costs versus savings (e.g. lower financing costs). This void should be filled by future research.

Opportunities for expanding the scope and appeal of energy savings insurance include developing applications for existing buildings, products that can be purchased directly by building owners who do their own retrofit work, improved harmonization with the ESCO industry, and securing lower premiums through initiatives to reduce the risk of losses and costs of savings measurement and verification.

8 ACKNOWLEDGMENTS

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APPENDIX A. SAMPLE ENERGY SAVINGS INSURANCE POLICY

(Note: This is a sample policy. Terms and exclusions are negotiated on a case-by-case basis. See overleaf for the sample policy)

UTILITY SAVINGS INSURANCE

An Energy and Water Savings Guarantee Designed for the GREEN BUILDINGS Conservation Program

DECLARATIONS

POLICY INFORMATION	POLICY NUMBER	INCLUDING ENDORSEMENTS
INSURED INFORMATION	NAME MAILING ADDRESS	
ADDITIONAL NAMED INSURED		
LOSS PAYEE INFORMATION	NAME	
	MAILING ADDRESS	
TERM OF INSURANCE	COMMENCEMENT OF INSURANCE	POLICY PERIOD A continuous period of _____ years from the commencement of insurance
PROJECT VALUE **DEDUCTIBLE** **AMOUNT OF INSURANCE**	$ $ $	
COST OF INSURANCE	$ Payable within 30 days of the Effective Date	

revision: 9/12/01 by Bruce Jay

UTILITY SAVINGS INSURANCE

Policy No.:_____

INSURING AGREEMENT

CGU Insurance Company of Canada with an office at 5140 Yonge Street #1800, North York, Ontario, hereafter referred to as *"Insurers"* and as *"Company,"* in consideration of the premium paid, and subject to the terms and conditions of the Policy, agrees to pay the INSURED, as stated in the DECLARATIONS, for loss as described in the Policy.

In witness whereof, the INSURERS have caused this Policy to be signed by Morris & Mackenzie Inc, its duly authorized representatives, at Vancouver, British Colombia, and Toronto, Ontario.

UTILITY SAVINGS INSURANCE

INSURANCE PROVIDED

The Insurers agree to pay the amount by which Actual Energy and Water Costs in any Policy Year exceed Estimated Energy and Water Costs in said Policy Year, subject to the provisions of the Policy.

EXCLUSIONS

This policy does not insure against Loss caused by or resulting from:

1. (a.) hostile or warlike action, including action in hindering, combating or defending against an actual, impending or expected attack, by:
   - (i.) any government or sovereign power (de jure or facto) or any authority maintaining or using military, naval or air forces or;
   - (ii.) military, naval or air forces or;
   - (iii.) an agent of any such government, power, authority or forces;

   (b.) insurrection, rebellion, revolution, civil war or usurped power, including any action in hindering, combating or defending against such an occurrence, or by confiscation by order of any government or public authority;

2. nuclear reaction, nuclear radiation or radioactive contamination;

3. the enforcement or amendment of any injunction, law, ordinance or regulation by any governmental, administrative or judicial authority which prevents, inhibits or alters, in whole or in part, the implementation or operation of the Facilities containing the installed Energy and Water Efficiency Measures;

4. failure or inability to obtain required licenses or permits from governmental authorities;

5. financial default or insolvency of the Insured or any person, company or organization acting on behalf of the Insured;

6. vandalism, riot, sabotage, terrorism, malicious mischief, labour slowdown, strike or lockout;

7. perils which are insured under Required Insurances;

8. physical damage to the Energy and Water Efficiency Measures, however caused;

9. Energy and Water Costs that could have been avoided by reasonable and accepted industry standards of maintenance, operation or replacement procedures or by appropriate action in response to a written recommendation by the Insurers. In the event of disagreement as to what constitutes “reasonable and accepted industry standards, “ such determination shall be made by a qualified third party, acceptable to both the Insurers and the Insured;

10. failure to repair or maintain equipment not connected to the Energy and Water Efficiency Measures;

11. loss or interruption of any outside service or supply of fuel;

12. any material change in the building, its use, or occupancy;

13. the addition of any equipment which increases the total energy and water use by 1% or more;

14. environmentally unsafe and unhealthy materials released during the construction or operation of the Energy and Water Efficiency Measures;

15. any and all third party damage(s) or claim(s);

16. contributory negligence on the part of the Insured.

DEFINITIONS

1. Acceptance Tests
All tests, as set out in the feasibility study and related documents, which demonstrate that the Energy and Water Efficiency Measures have been properly constructed and perform in accordance with their design criteria.

2. Baseline Assumptions
Those factors including but not limited to type, frequency, intensity of use of the building, seasonal temperature averages, utility services usage, fuel costs, costs of outside services, wage and salary rates and cost escalation factors, on which all calculated Energy and Water Costs are based, as set forth in Endorsement 3.

3. Effective Date
The date when the Insurers are committed to provide the insurance.

4. Energy and Water Efficiency Measures
The energy and water system improvements to be undertaken as described in Endorsement 1.

5. Loss

The amount by which Actual Energy and Water Costs in any Policy Year exceed Estimated Energy and Water Costs in said Policy Year after application of Baseline adjustments, if any.

6. Energy and Water Costs

All costs including but not limited to the cost of Energy and Water purchased from utilities or other suppliers, fuel, outside services, maintenance, operation and supervision as specified in the Project Feasibility Study and related design documents, and as included in Endorsement 3, incurred in the provision of utility services for the Project. Energy and Water Costs do not include debt service, depreciation or late payment charges.

(a) Actual Energy and Water Costs

The Energy and Water Costs actually incurred subsequent to the contractually installed Energy and Water efficiency measures. See Endorsement 3

(b) Estimated Energy and Water Costs

The estimate, made prior to Policy issuance, of Energy and Water Costs expected to be incurred subsequent to the contractually installed Energy and Water measures. See Endorsement 3.

Actual or Estimated Energy and Water Costs will be adjusted as per Condiiton 17 below to reflect divergences from Baseline Assumptions included in the Feasibility Study and related documents and as set out in Endorsement 3. If not specified in the Feasibility Study and related documents, the application of baseline adjustments to either Actual or Estimated Costs will be mutually agreeed upon by the Insured and the Insurer prior to the first annual adjustment and review.

7. Policy Year

A period of twelve (12) consecutive months, within the Policy period, from the Commencement of Insurance or an anniversary of the Commencement of Insurance.

8. Required Insurances

Any and all insurances the Insured has in force at any time during the Term of Insurance which insure any aspect of this project, including but not limited to: Builder's Risks, Design Errors and Omissions, Property, Liability, Boiler and Machinery and Business Interruption insurance all on a broad form basis and as
set forth in Certificates of Insurance attached to this Policy or as set forth in Endorsement 4.

CONDITIONS

1. Policy

The Policy includes the Application and/or Feasibility Study and related documents, the Insuring Agreement, Declarations, any Endorsements specified in the Declarations

together with any other Endorsements to the Policy subsequently issued.
Wherever in the Policy reference is made to an Endorsement which has been canceled and replaced by another Endorsement, such reference shall be understood to refer to the replacing Endorsement.

2. Application and Other Representations

The policy is issued in reliance upon any representations made by the Insured, its agents and representatives for the project, upon the insurance application, and upon the feasibility study and related documents which form a part of this policy.

3. Additional Named Insured

Any person or organization named in the Policy as an "Additional Named Insured" shall be considered as an Insured under the Policy only as respects their interest in the Project. The naming of any Additional Named Insured shall not serve to increase the liability of the Insurers under this Policy.

4. Commencement of Insurance

The Insurers' liability under this Policy shall commence when all of the following have been met:

(a) the installation of the proposed Energy and Water efficiency measures has been completed;

(b) the Acceptance Tests, if applicable, have been carried out according to the procedures established in the testing and commissioning protocol contained within the feasibility study and related documents, and all project measures have demonstrated the efficiencies of consumption and output projected in the feasibility study and related documents ;

(c) the Energy and Water efficiency measures as installed have been accepted by the Insured.

5. Contract Changes

There shall be no material change in the design, materials, operating or construction contracts as set forth in Endorsement 1, without the prior written consent of the Insurers.

6. Abandonment

There shall be no abandonment to the Insurers of the Project.

7. Required Insurances

The Insured shall maintain in force the Required Insurances for the term of this insurance. which include deductible and self-insured retention provisions. Should the insurance carriers cancel or refuse to renew any or all Required Insurances, the Insured must give immediate notice of such cancellation or refusal to the Insurers.

8. Concealment or Misrepresentation

This Policy shall be void if the Insured intentionally conceals or misrepresents any material fact or circumstance relating to this insurance at any time.

9. Assignment

Assignment or transfer of this Policy shall not be valid except with the written consent of the Insurers.

10. Termination

The Policy may be terminated by the Insurers for nonpayment of premium, with fifteen (15) days' written notice to the Insured and the Loss Payee (if any). The Policy may also be terminated by the Insurers if the conditions for Commencement of Insurance can not, after repeated attempts, be met, or where progress toward meeting said conditions is manifestly absent. The Insurers will retain a minimum premium equal to 20% of the premium paid for this Policy and will refund the balance to the Insured.

The Policy may be terminated by the Insured by delivering or mailing it to the Insurers, stating when thereafter such termination shall be effective. If the Insured cancels this Policy, the premium shall be considered fully earned and not subject to short term adjustments of any kind.

11. Special Government Requirements

Any and all provisions of this Policy which are in conflict with the statutes of the jurisdiction wherein this Policy is issued are understood, declared and acknowledged by the Insurers to be amended to conform to such statutes.

12. Inspection and Consultation

Upon the effective date of the Policy and throughout the term of insurance, the Insurers shall be permitted but not obligated to inspect the Project at all reasonable times before, during and subsequent to the installation of the Energy and Water efficiency measures.

Neither the Insurers' right to make inspections nor the making thereof nor any report thereon shall constitute an undertaking on behalf of or for the benefit of the Named Insured or others, to determine or warrant that the operation of the Energy and Water Efficiency Measures are safe or healthful.

13. Required Tests

If the Insurers have reason to believe that the inability of the Energy and Water Efficiency Measures to keep Actual Energy and Water Costs at or below the level of Estimated Energy and Water Costs is due, in whole or in part, to variance of the type, quantity or quality of fuel or feedstock from specifications, it shall have the right to require that a test be conducted at the Insured's expense to verify that such fuel or feedstock is in accordance with the Energy and Water Efficiency Measures' specifications. Should the test prove that the fuel or feedstock meets specifications, the Insurers shall reimburse the Insured for expenses paid to others in conducting the tests.

Further, if the Insurers have reason to believe that the failure to keep Actual Energy and Water Costs at or below the level of Estimated Energy and Water Costs is caused by any circumstance excluded by this Policy, it shall have the right to require a performance test. This test will be at the Insurers' expense and will be designed to ascertain if, and the extent to which, the cause of said failure falls within the province of the Policy.

14. Deductible Fund

A Deductible Fund shall be established for the insured project in an amount as stated in the Declarations. The Deductible Fund is to be held and administered by the Insured. Alternatively and where applicable, the Fund may be held by the Project Financier until the end of the Policy Period. Withdrawals and repayments to the fund shall be made in accordance with the Adjustment Conditions.

15. Books, Records and Audit

Energy and Water Costs will be monitored and recorded by the Insured as specified in the Monitoring and Verification portion of the Feasibility Study and related documents on a basis agreed with the Insurers. The Insured will maintain books and records in such a manner that said costs can be accurately determined. The Insurers may examine and audit such books and records at any reasonable time, upon prior request to the Insured.

16. Reporting

The Insured shall on a periodic basis, as set out in the Feasibility Study and related documents, submit a report to the Insurer showing the Actual Energy and Water Costs for the period.

17. Adjustment of Energy and Water Costs

At the end of each Policy Year, the Insurer and the Insured shall review the Baseline Assumptions. If Energy and Water Costs are increased by variance from any or all of the Baseline Assumptions used in establishing Estimated Energy and Water Costs, appropriate adjustment shall be made to Actual or Estimated Energy and Water Costs to determine the liability, if any, of the Insurers.

In the event that an increase in Energy and Water Costs is due to causes excluded from this Policy, the appropriate adjustment shall be made in the Actual or Estimated Energy and Water Costs to determine the liability, if any, of the Insurers.

18. Adjustment

At the end of each Policy Year, the Insured and the Insurer shall review the Actual and Estimated Energy and Water Costs for the previous twelve (12) months as adjusted in accordance with Condition 17.

If the Actual Energy and Water Costs are greater than the Estimated Energy and Water Costs as adjusted in accordance with Condition 17, the Deductible Fund shall first apply to the extent of such difference.

If the Estimated Energy and Water Costs are greater than the Actual Energy and Water Costs as adjusted in accordance with Condition 17, the difference shall be used firstly to restore the Deductible Fund to its original amount. Any excess may then be used

(a) to enable early retirement of Project debt, or
(b) to make distributions to the Insured. Any surplus so applied is repayable, if necessary, to the Deductible Fund in the event that a drawdown of the Fund occurs.

At the end of the Project, a final accounting shall be made and any amount remaining in the Deductible Fund shall be retained by the Insured.

19. Notification of Loss

The Insured must notify the Insurers immediately upon learning that the operation of the facility incorporating the Energy and Water Efficiency Measures is likely to produce loss under the Policy. Such notification is to be made to Morris & Mackenzie Inc.

20. Mitigation

Where Actual Energy and Water Costs are greater than the Estimated Energy and Water Costs, as adjusted, the Insurers may, at their option and in consultation with the Insured, pay any reasonable expenses incurred to reduce or avert liability for Loss, but not in excess of the amount that would have been payable had no such action been taken. Such expenses shall be reimbursed from amounts available, if any, in the Deductible Fund.

21. Loss Adjustment

There shall be no loss under the Policy until the Deductible Fund has been exhausted. Losses reported shall be adjusted at the end of each Policy Year. Any loss due to causes excluded from this Policy shall not apply in determining the Insurers' liability under the Policy.

22. Repair and/or Improvement

The Insurers shall not be liable for any costs of repair and/or improvement of the Energy and Water Efficiency Measures except for those taken to mitigate loss under the Policy.

23. Limit of Liability

The Insurers' liability shall not exceed the Limit of Liability stated in the Declarations. Except for expenses reimbursed to the Insurers from the Deductible Fund, any payments for loss or for expenses incurred by the Insurers to reduce or avert loss shall reduce by like amount the Limit of Liability.

24. Loss Payable

Loss, if any, shall be payable to the Insured or, if so designated, to the Loss Payee as shown on the Declarations. Expenses that are incurred, with the approval of the Insurers, to reduce or avert loss under this Policy shall be payable to the Insured or as directed by the Insured.

25. Subrogation

In the event of any payment under this Policy, the Insurers shall be subrogated to the Insured's right of recovery against any person or organization, and the Insured shall execute and deliver instruments and papers and do whatever else is necessary to secure such rights. The Insured shall do nothing after Actual Energy and Water Costs exceed Estimated Energy and Water Costs, as adjusted, to prejudice such rights.

26. Other Insurance

The Policy does not cover any loss which is insured by, or would, but for the existence of this Policy, be insured by any other insurance policy or policies, either primary or excess. As used herein, the words “any other insurance policy or policies” shall include any deductible or self-insured retention provisions.

27. Action Against the Insurers

No action shall lie against the Insurers unless, as a condition precedent thereto, the Insured shall have fully complied with all the terms of this Policy and unless commenced within fourteen (14) months from the date of Notification of Loss, as required in Condition 19.

UTILITY SAVINGS INSURANCE: ENDORSEMENT NO. 1

Policy No.: **Transaction No.:**

Insured:

Project Location:

Project Manager And Contact Person Including Telephone No.:

ENERGY & WATER DELIVERY SYSTEMS

Summary of Energy and Water Savings features comprising the insured project.

UTILITY SAVINGS INSURANCE: ENDORSEMENT NO. 2

Policy No.: **Transaction No.:**

Insured:

Project Location:

WARRANTIES

It is understood that this Policy has been issued in reliance on the following agreements and/or specifications:

< Feasibility Study prepared by . . . . . ;
< Project Detail Design performed by . . . . . ;
< Project Management Services provided by . . . . . ;
< Project Installation carried out by . . . . . ;
< Testing and Commissioning Procedures:
developed by . . . . . ;
overseen and approved by . . . . . ;
• Monitoring and Verification Procedures:
designed by . . . . . ;
carried out by . . . . . ;

Any material changes that are made in the foregoing agreements or specifications, if made without the express written consent of the Insurers, shall void the insurance provided by this Policy.

UTILITY SAVINGS INSURANCE: ENDORSEMENT NO. 3

Policy No.: **Transaction No.:**

Insured:

Project Location:

ENERGY and WATER SAVINGS VERIFICATION

Savings or Shortfalls amounts are calculated asfollows:

•Estimated Energy and Water Costs **less** Actual Energy and Water Costs

In accordance with Condition 17, any variance from Baseline Assumptions shall result in an appropriate adjustment to either actual or estimated energy and water costs as determined by the monitoring and verification methodology designed for the project. In both cases, negative results indicate a shortfall.

Annual values for **A.**, **B. C.** and **D.** below will be provided through the Monitoring and Verification process and based on approved control software such as Metrix.

	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
A. Actual Energy & Water Costs	**$**	**$**	**$**	**$**	**$**
B. Estimated Energy & Water Costs	**$**	**$**	**$**	**$**	**$**

C. Baseline Assumptions

D. Adjustments to Baseline and impact on Actual and Estimated costs

E. Methodology for handling changes in Energy & Water Costs

With reference to Condition 17, it is understood that, should any increase in Energy & Water Costs be due to (a) causes excluded from the Policy, or (b) any variance from Baseline Assumptions, adjustments to reflect the impact of such causes or variances shall be made to Actual Energy and Water Costs or to Estimated Energy and Water Costs, as appropriate, in order to reflect what said costs would have been, had the excluded causes and/or variances from Baseline Assumptions not occurred.

UTILITY SAVINGS INSURANCE: ENDORSEMENT NO. 4

Policy No.: **Transaction No.:**

Insured:

Project Location:

REQUIRED INSURANCES